

DOCUMENT RESUME

ED 203 297

CS 006 135

AUTHOR Brown, Ann L.: And Others
TITLE Learning to Learn: On Training Students to Learn from Texts. Technical Report No. 189.
INSTITUTION Bolt, Beranek and Newman, Inc., Cambridge, Mass.: Illinois Univ., Urbana. Center for the Study of Reading.
SPONS AGENCY National Inst. of Child Health and Human Development (NIH), Bethesda, Md.: National Inst. of Education (ED), Washington, D.C.
PUB DATE Nov 80
CONTRACT 400-76-0116
GRANT HD-00111; HD-05951; HD-06864
NOTE 47p.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Critical Reading; Elementary Secondary Education; *Learning Processes; Learning Theories; *Metacognition; Prior Learning; *Reading Processes; Reading Research; Reading Skills; Rote Learning; *Study Skills
IDENTIFIERS *Learning Strategies; *Reading Strategies

ABSTRACT

Focusing on how teachers can devise instructional routines to help students learn to learn, this paper discusses mechanisms for training students to devise their own strategies for learning. Because of the dominance of deliberate memory strategies in training research, the paper begins with a brief consideration of such literature, then proceeds to discuss training aimed at bringing students to understand the significance of learning strategies, particularly in relation to school tasks such as studying texts. Reviewing studies on learning strategies, the paper points out that strategies that do not appraise the utility of their action fail to inculcate necessary student self-awareness; whereas students informed of the outcome of their action and instructed in self-corrective procedures have been much more successful at securing desirable effects of training. The paper notes that effective learning involves a tetrahedral model with four main considerations: (1) the activities engaged in by the learner; (2) characteristics of the learner, including capacity and state of prior knowledge; (3) the nature of the materials to be learned (pictures, stories, expository texts, maps); and (4) the criterial task (rote recall, gist recall, noting inconsistencies, following instructions). The paper concludes that attending to these considerations will make students more effective learners. (PL)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED203297

CENTER FOR THE STUDY OF READING

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

f This document has been reproduced as
received from the person or organization
originating it.
Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official NIE
position or policy.

Technical Report No. 189

LEARNING TO LEARN:
ON TRAINING STUDENTS TO LEARN FROM TEXTS

Ann L. Brown, Joseph C. Campione,
and Jeanne D. Day

University of Illinois at Urbana-Champaign

November 1980

University of Illinois
at Urbana-Champaign
51 Gerty Drive
Champaign, Illinois 61820

Bolt Beranek and Newman Inc.
50 Moulton Street
Cambridge, Massachusetts 02138

This paper is based on an invited address given by the first author at the annual meetings of the American Educational Research Association in Boston, April 1980. Preparation of the manuscript was supported in part by Grants HD 05951, HD 06864, and Research Career Development Award HD 00111 from the National Institute of Child Health and Human Development; and in part by the National Institute of Education under Contract No. HEW-NIE-C-400-76-0116.

Jeanne Day is now at the University of Notre Dame.

CS806135

Learning to Learn:

On Training Students to Learn from Texts

The general theme of this paper is how we can devise instructional routines to help students learn to learn. The dominant questions that have motivated training studies in developmental psychology are: Can we improve upon students' spontaneous performance and, further, can we enhance their ability to perform future tasks of the same kind? There are several possible outcomes of training studies aimed at improving students' academic performance. Such studies can fail, of course, in that they may result in no worthwhile changes in students' performance. They can succeed by adding substantially to the students' knowledge, or they can succeed by instructing students in ways to enhance their own knowledge--i.e., by promoting learning-to-learn activities. It is this third outcome that we think is most desirable and that we will consider in this paper.

In order to ensure that we share a common vocabulary, we would like to begin by introducing distinctions among three interrelated types of knowledge that influence students' current state of learning and their ability to profit from instruction. These three types of knowledge are strategic, content or factual, and metacognitive information (Brown, 1975; Chi, in press). Strategic knowledge refers to the repertoire of rules, procedures, tricks, routines, etc. for making learning a more efficient activity (Brown, 1975). Content or factual knowledge refers to information that learners have concerning the subject domain under consideration and

their general knowledge of the world (Anderson, 1977; Brown, 1975, and in press; Chi, in press). Metacognitive knowledge refers to the information that learners have concerning the state of their own knowledge base and the task demands they are facing (Brown, 1975, and in press; Flavell & Wellman, 1977).

In principle, training studies can aim at improving all three kinds of knowledge, but in actual fact it is easier to effect change in some domains than in others, as we shall see. The majority of the developmental training studies have concentrated on deliberate strategies of learning, or strategies for promoting recall of information, mainly because of the relative ease of effecting improvement in this domain. But rote recall, although valuable, is not the only desirable outcome of learning activities. Often we want to enhance students' ability to understand the significance of the material they are learning rather than to improve their ability to recall it. Activities that promote recall need not necessarily be optimal for promoting other learning products (Bransford, 1979; Brown, in press; Nitsch, 1977). But because of the dominance of deliberate memory strategies in training research, we will begin with a brief consideration of this literature and then proceed to discuss training aimed at bringing students to understand the significance of learning strategies, particularly in relation to school tasks such as studying texts.

Strategies of Rote Recall

The most commonly studied strategies of rote recall are rehearsal, categorization and elaboration (Brown, 1974; Campione & Brown, 1977). We cannot ignore the knowledge base even when dealing with these simple strategies. For example, although it is not always so, rehearsal can be an activity carried out on material that has no inherent meaning. It can be, and often is, a brute force approach that does not demand any understanding of the significance of the material being processed. The learner is required merely to repeat segments of material until they can be rote-recalled. Categorization as a strategy to enhance recall demands that any categorical organization inherent in the material be familiar to the learner --i.e., be available in the knowledge base, and be used to design a plan for learning. Elaboration is a strategy whereby the learner imposes meaning or organization on material to render it more comprehensible--for example, by embedding unrelated pairs of items into meaningful stories. Thus, even with these simple rote recall strategies, the child's knowledge base is involved to some extent (Brown, 1975; Chi, in press).

The degree to which active transformation of the material is required, and the degree to which it is necessary to refine strategies, or even combine elements of different strategies, determines age of initial use and developmental trajectories. In general, however, the emergence of strategies such as these tends to be dependent on the degree and recency of formal schooling (Brown, 1977). In schooled populations, these strategies emerge in a recognizable form between 5 and 7 years of age and continue to

be tuned and refined throughout the school years. Also common to the developmental course of these strategies is an intermediate stage, called a production deficiency, where the child does not produce the strategy spontaneously, but can be prompted or instructed to do so quite readily. Training studies in developmental research were initially aimed at examining the intermediate stage of production deficiencies for theoretical reasons that need not concern us here. In some cases, however, the aim was to help the slow-learning child produce strategies that he would rarely come to produce spontaneously (Brown, 1974; Brown & Campione, 1978), and it is these "instructional" studies that we will consider next.

Training Rote Recall Strategies

What form do these training studies take? To simplify a very extensive literature, there are three types of training that have been attempted. The first group, and by far the most heavily populated, is the blind training study. By this we mean that the students are not active conspirators in the training process. They are induced to use the strategy, or tricked into deep processing activities, without a concurrent understanding of the significance of that activity. For example, the child is taught to use a cumulative rehearsal strategy by initially copying an adult, but he is not told explicitly why he is acting this way, or that it helps performance, or that it is an activity appropriate to a certain class of memory situations (Brown, 1974). In the task of free recall of categorizable materials, the child can be tricked into using the categorical structure by clever incidental orienting instructions (Murphy & Brown, 1975), or the material

can be blocked into categories for the learner (Gerjuoy & Spitz, 1966), or recall can be cued by category name (Green, 1974), but the child does not know why, or even if, this helps recall. In elaboration tasks, the child can be induced to provide an elaborated encoding of a pair of unrelated items (e.g., by asking him why-questions such as: "Why is the soap hiding under the jacket?", etc.) but the child is not informed that this activity can be an effective learning strategy (Turnure, Buium, & Thurlow, 1976). All of these tricks lead to enhanced recall because the learner is producing an appropriate activity. They fail, however, to result in maintenance or generalization of the strategy--i.e., the child neither uses the activity subsequently of his own volition, nor transfers the activity to similar learning situations. This is scarcely surprising, as the significance of the activity was never made clear to the learner.

An intermediate level of instruction, informed training, is where the child is both induced to use a strategy and also given some information concerning the significance of that activity. For example, it is possible to teach children to rehearse and then give feedback concerning their improved performance (Kennedy & Miller, 1976), or to teach them to rehearse on more than one rehearsal task; i.e., they may be trained in multiple contexts so that they can see the utility of the strategy (Belmont, Butterfield, & Borkowski, 1978). In the categorization task, students may be given practice in putting items into categories and informed that this will help them remember, and cued by category on retrieval failure; that is, a whole package designed to show children a learning strategy that works

(Burger, Blackman, Holmes, & Zetlin, 1978; Ringel & Springer, 1980). These training packages result in both improved performance on the training task and maintenance of the activity by the child when faced with subsequent similar problems. There is some evidence of generalization, but so far the evidence has been very weak, and the transfer very near--i.e., the generalization task is very similar to the training task (Brown & Campione, 1978, and in press).

The third level of instruction, self-control training, is the situation in which the child is not only instructed in the use of a strategy but is also explicitly instructed in how to employ, monitor, check and evaluate that strategy. The number of studies that have employed this combination are few, but preliminary results do indicate that the strategy-plus-control training packages are the most successful at inducing not only enhanced performance but also transfer of training to appropriate settings (Brown & Campione, in press). We will illustrate this type of training with a successful study from our laboratory (Brown, Campione, & Barclay, 1979).

Recall-Readiness Training Study

We were interested in teaching mildly retarded grade school children the simple skill of checking to see if they knew material sufficiently well to be tested. This is an essential prerequisite for effective studying and one that young children have difficulty understanding (Flavell, Friedrichs, & Hoyt, 1970). So we devised a simple task where we could make the self-checking demands of such studying activities quite explicit. The hope was that with the essential elements made clear in a simple situation, we could look for transfer to more complex, school-like learning tasks.

The simple training task consisted of presenting the students with a list of pictures equal to $1\frac{1}{2}$ times their span for picture lists. The pictures were presented in a series of windows, and could be viewed when each window was pressed. Only one picture was visible at a time, but the students could investigate the windows in any order and as frequently as they wished. They were also told to ring a bell when they felt they were ready to be tested for recall. Performance was initially poor, even though the children were free to study for as long as they liked.

During the training portion of the study, children were taught strategies which could be used to facilitate their learning of the lists, along with the overseeing or monitoring of those strategies. The latter aspect of training was accomplished by employing strategies which included a self-testing component and by telling the children to monitor their state of learning. For example, in a rehearsal condition, the subjects were told to break the list down into manageable subsets (three items) and rehearse those subsets separately. They were also instructed to continue rehearsing the subsets until they were sure they could recall all of the items. Note that one can only continue to rehearse all the items if one can remember them well enough to produce them for rehearsal. Thus, in this situation, rehearsal serves both to facilitate learning and to provide a check on the state of that learning. Anticipation was another trained strategy which included self-testing features. Here the children were instructed to try to remember the name of a picture before they pressed the window. Children in a final condition, labeling, served as a control group; they were told to go

through the list repeatedly labeling each item as they exposed it. In all conditions, the students were told to continue the trained activity until they were sure they were ready to recall all the picture names.

There were two groups of trainees; the older children were approximately 11 years old with mental ages of 8 years. The younger children were 9 years old (MA = 6). Consider first the older children. Those taught the strategies involving a self-testing component improved their performance significantly (from 58% correct to almost perfect accuracy), whereas those in the control condition did not. These effects were extremely durable, lasting over a series of posttests, the last test occurring one year after the training had ended.

The younger children (MA = 6, CA = 9) did not benefit so much from training. They improved their performance significantly above baseline only on the first posttest, which was prompted; i.e., the experimenter told the children to continue using the strategy they had been taught. In the absence of such prompts, they did not differ significantly from baseline. Note that the younger and older children did not differ on original learning but did differ in how readily they responded to training. Tests of original competence provide only part of the picture, for the degree to which students can profit from training is also essential information for diagnosis of their "zone of potential development" (Brown, in press; Brown & French, 1979; Vygotsky, 1978)--i.e., how well they can operate in any domain given support.

The tendency for the younger children to abandon a trained strategy when not explicitly instructed to continue in its use is quite dramatically illustrated in the maintenance tests that took place one year after original learning. On the first two days of testing, the children were not prompted to use a strategy, and they performed at baseline levels. On the third day the experimenter told them to "try to remember when we did this game before: --remember that you said the picture names over and over (rehearsal), or remember that you tried to guess the picture names before you pressed the windows (anticipation)." These mild prompts resulted in a big improvement in performance (their accuracy increased from 60% to 90%). This improvement was not maintained on the final, unprompted test, where the students returned to their 60% accuracy level. This is a dramatic illustration of a common problem that bedevils would-be trainers of slow-learning children: Such children tend not to use even the skills they have available to them (Brown, in press; Brown & Campione, in press).

The picture was much more optimistic for the older children, and therefore we decided to investigate whether they had learned any general features about self-testing and monitoring on the simple laboratory task that they could transfer to a more school-like situation, learning the gist of prose passages. The students (previously trained in gist recall procedures) were seen for 6 days. On each day they studied two stories commensurate with their reading ability. When it was clear that the children could read all the words, they were instructed to continue studying until they were ready to attempt recall. The trained students (in the

anticipation and rehearsal groups) outperformed a pair of control groups (label and naive control) on four measures: (a) the total amount recalled, (b) pattern of recall as a function of textual importance, (c) time spent studying, and (d) observations of overt strategy use (such as lip movement, looking away, self-testing, etc.). Training on a very simple self-checking task did transfer to the school-like task of studying texts. Thus, an effective technique for inducing the rudiments of mature studying behavior is to (a) simplify the task so that the basic rules can be demonstrated, (b) train an appropriate learning strategy, and (c) train the self-monitoring of that strategy.

General Prescription for Training Rote Recall Strategies

The outcome of the past decade of work on training children to acquire and use a repertoire of basic study skills is that we can describe the essential steps of a successful training program (Brown & Campione, 1978, and in press). We do not have space to go into the steps in detail, or to do justice to the literatures that support these assumptions. Detailed treatments of each point can be found in the references following each point. But the points can be understood without the background literature, and indeed, the cynical may question why a literature was needed to arrive at such self-evident truths! The eight steps are: (a) train an instructionally relevant skill (Resnick & Glaser, 1976); (b) train the skill on a simple analogue of the target task and then fade in more complex procedures (Brown, Campione, & Barclay, 1979); (c) gear training to the starting competence of the learner (Brown, 1979; Brown & DeLoache, 1978;

Siegler, in press); (d) invest in careful task analyses of both the training vehicle and the transfer task so that the exact locus of training or transfer failures may be diagnosed (Belmont & Butterfield, 1977; Campione & Brown, 1974, 1977); (e) provide direct feedback concerning the effectiveness of strategy use (Brown & Campione, 1978; Kennedy & Miller, 1976; Ringel & Springer, 1980); (f) provide direct instruction concerning the range of applicability of the strategy and the need for generalization (Brown, 1978); (g) provide training in multiple contexts so that the range of applicability can be demonstrated (Belmont, Butterfield, & Borkowski, 1978; Brown, 1978); (h) provide direct instruction in self-management skills, or the self-regulation and monitoring of strategy selection and deployment (Brown & Campione, 1978, and in press; Brown, Campione, & Barclay, 1979).

There are two general points underlying this prescription: (a) The children should be fully informed participants in the training enterprise; i.e., they should be made to understand why they should be strategic and when it is necessary to be so; (b) the children should be trained in the self-management of the strategies they must deploy. Of course, the degree of explicit training needed will depend on the starting competence of the children and their general speed of learning. For slower children, or those with little prior knowledge, it might be necessary to make each step explicit. This is usually the case with mentally retarded students (Brown, 1974, 1978; Campione & Brown, 1977). Brighter, better-informed students tend to show some spontaneous transfer, and therefore it is often not necessary to make explicit the need for transfer, etc. The degree to which

it is necessary to make each step explicit is a measure of the child's zone of potential development or region of sensitivity to instruction (see Brown & French, 1979, for a discussion of this Vygotskian concept).

Coming to Understand the Significance of One's Activities

Recall of information is often demanded in schools, both verbatim recall, as in vocabulary tests, and gist recall, as when the student is required to reconstruct the essential meaning of a text. Developing strategies that aid recall of information is therefore a worthwhile activity. But recall of information is not the only desirable outcome of learning, and strategies that promote recall of information are not always the most appropriate for enhancing other learning outcomes. For example, Nitsch (1977) found that different kinds of practice were needed to ensure that learners could remember the definition of concepts, as opposed to ensuring that they could readily understand new instances of the concepts. Students were trained in the meaning of concepts such as to crinch: to make someone angry by performing an inappropriate act, or to minge: to gang up on a person or thing. Training the use of a concept in a common context led to rapid rote learning of the definition of that concept but did not result in ready transfer to new contexts or a generalized concept of "crinch" or "minge." Training the use of a concept in a variety of contexts led to slower learning of the definition but much broader generalization. Students in the latter condition took longer to learn the definitions but were much better able to understand novel instances. A similar finding was reported by Mayer and Greeno (1972) concerning the appropriate training for students

learning the binomial distribution. Repeated practice in using the formula or rule led to very accurate performance on subsequent problems of exactly the same form as training, whereas training aimed at explaining the significance of the components of the formula led to somewhat less accurate rule use but far better performance on alternate statements of the problem class, such as word problems.

Thus, in order to design appropriate training we need to analyze the question, Training for what? And similarly, in order to become really effective learners, children must analyze the learning situation for themselves; i.e., they must learn how to understand the significance of their activities and the particular demands of the task they are facing (Bransford, 1979; Brown, in press). Effective learning involves four main considerations: (a) The activities engaged in by the learner, (b) characteristics of the learner, including his capacity and state of prior knowledge, (c) the nature of the materials to be learned (pictures, stories, expository texts, maps, etc.), and (d) the criterial task (rote verbatim recall, gist recall, understanding novel instances of a concept, noting inconsistencies, following instructions, etc.).

In order for the psychologist or educator to devise a training program, it is necessary to consider all four aspects of the learning situation. For example, consider learning from texts. Any strategy (learning activity) one might adopt should be influenced by the inherent structure of the text (its syntactic, semantic, and structural complexity, its adherence to good form, etc.), the extent to which the text's informational content is compatible

with existing knowledge (characteristics of the learner), and the test to which the learning must be put (criterial task, i.e., gist recall, resolving ambiguities, acquiring basic concepts, understanding instructions, etc.). As psychologists interested in understanding and promoting learning, we must appreciate the complex interactions implicit in any learning situation. We would like to argue further that this is exactly what the student must do. In order to become expert learners, students must develop some of the same insights into the demands of the learning situation as the psychologist. They must learn about their own cognitive characteristics, their available learning strategies, the demands of various learning tasks and the inherent structure of the material. They must tailor their activities finely to the competing demands of all these forces in order to become flexible and effective learners. In other words, they must learn how to learn (Bransford, Stein, Shelton, & Owings, 1980; Brown, in press).

We have argued that the effective learner is one who understands the significance of learning for different purposes, one who at least implicitly considers the four points of the tetrahedron as part of the learning context. As instructors, then, our task is to devise training routines that will help the student to develop this profile of learning, to appreciate the importance of the tetrahedral model. In principle, training can be aimed at all four points; in fact, the majority of studies have aimed at training strategies or rules for prose processing. There is a very good reason for this. If one has an adequate task analysis of the rules or strategies involved in any one task, it is relatively easy to impart this knowledge to

students. It is not so easy, for example, to remedy a deficient knowledge base. We will return to this point later. Here we will illustrate strategy training with a series of studies concerned with inculcating basic rules for summarizing texts.

Training Strategies for Summarization

The ability to provide an adequate summary is a useful tool for understanding and studying texts. For example, an essential element of effective studying is the ability to estimate one's readiness to be tested, and we dealt earlier with simple procedures for ensuring at least a primitive form of self-testing (Brown, Campione, & Barclay, 1979). A commonly reported sophisticated method of testing one's level of comprehension and retention and, therefore, one's preparedness for a test, is to attempt to summarize the material one has been reading. This is quite a difficult task for immature learners. After considering many examples of childrens' failures and experts' successes when summarizing texts, we identified six basic rules that are essential to summarization (Brown & Day, Note 1), operations that are very similar to the macrorules described by Kintsch and van Dijk (1978) as basic operations involved in comprehending and remembering prose.

Two of the six rules involve the deletion of unnecessary material. One should obviously delete material that is trivial, and even grade-school children are quite adept at this if the content of the material is familiar (Brown & Day, Note 1). One should also delete material that is important but redundant. Two of the rules of summarization involve the substitution

of a superordinate term or event for a list of items or actions. For example, if a text contains a list such as, cats, dogs, goldfish, gerbils and parrots, one can substitute the term pets. Similarly, one can substitute a superordinate action for a list of subcomponents of that action, e.g., John went to London, for: John left the house, John went to the train station, John bought a ticket, etc. etc. These rules are roughly comparable to Kintsch and van Dijk's generalization rules. The two remaining rules have to do with providing a summary of the main constituent unit of text, the paragraph. The first rule is: Select a topic sentence, if any, for this is the author's summary of the paragraph. The second rule is: If there is no topic sentence, invent your own. These operations are roughly equivalent to Kintsch and van Dijk's integration and construction rules.

These operations are used freely by experts when summarizing texts (Brown & Day, Note 1), but do less sophisticated readers realize that these basic rules can be applied? To examine the developmental progression associated with the use of the basic rules, we examined the ability of children from grades 5, 7, and 10, and various college students to use the rules while summarizing. We used specially constructed texts that enabled us to predict when each rule should be applied, or at least would be applied by experts (college rhetoric teachers). Even the youngest children were able to use the two deletion rules with above 90% accuracy, showing that they understood the basic idea behind a summary--get rid of unnecessary material. On the more complex rules, however, developmental differences

were apparent. Students became increasingly adept at using the topic sentence rules, with college students performing extremely well. However, the most difficult rule, invention, was rarely used by fifth graders, used on only a third of appropriate occasions by tenth graders and on only half of the occasions when it was appropriate even by college students. Experts, college rhetoric teachers, used the invention rule in almost every permissible case. But junior college students (remedial students) performed like seventh graders, having great difficulty with the invention rule and using only the deletion rules effectively.

We explained this developmental progression in terms of the degree of cognitive intervention needed to apply each rule. The easier deletion rules require that information in the text be omitted, and the intermediate topic sentence rule requires that the main sentence contained in a paragraph be identified. But the more difficult invention rule requires that learners supply a synopsis in their own words, i.e., add information rather than just delete, select, or manipulate sentences already provided. It is these processes of invention that are the essence of good summarization, that are used with facility by experts, and that are most difficult for novice learners.

Encouragingly, these rules can be taught. In a recent doctoral thesis, Day (1980) trained junior college students to apply the basic rules and to check that they were using the rules appropriately. The students were divided into two groups: "normal" students with no reading or writing problems identified, and remedial students who, although of normal reading

ability, were diagnosed as having writing problems. (A third group of students, with both reading and writing problems, was examined, but their data have not yet been analyzed.)

Within each of the two groups, there were four instructional conditions that varied in how explicit the training was: (a) Self-Management: The students were given general encouragement to write a good summary, to capture the main ideas, to dispense with trivia and all unnecessary words--- but they were not told rules for achieving this end. (b) Rules: The students were given explicit instructions and modelling in the use of the rules. For example, they were given various colored pencils and shown how to delete redundant information in red, delete trivial information in blue, write in superordinates for any lists, underline topic sentences if provided, and write in a topic sentence if needed. Then, they were to use the remaining information to write a summary. (c) Rules Plus Self-Management: The students in the third group were given both the general self-management instructions of Group I and the rules instruction of Group II, but they were left to integrate the two sets of information for themselves. (d) Control of the Rules: The fourth and most explicit training condition involved training in the rules, as in condition 2, and additional explicit training in the control of these rules; i.e., the students were shown how to check that they had a topic sentence for each paragraph (either underlined or written in), how to check that all redundancies had been deleted, all trivia erased, etc., and how to check that any lists of items had been replaced with superordinates. The

integration of the rules and appropriate self-control routines were explicitly modelled for the students. The amount of time spent in training and practice was the same for each group.

We will give only some selected outcomes, as the data are still being analyzed. The pretest data showed no effect of initial level of competence of the students and replicated our original junior college data (Brown & Day, Note 1). All students deleted appropriately (with above 90% accuracy), but they had much more difficulty with the topic sentence rules of selection and invention (25% and 15%, respectively).

The posttest data for the select and invent topic sentence rules revealed clear effects of ability level and degree of training. Consider first the select topic sentence data. All training had an effect; but for the less sophisticated learners, the most effective condition was the most explicit training, i.e., training in rules and their control. Training in rule use alone was an effective technique, but adding the general self-management instruction did not provide any additional help. The poorer students were not able to integrate the rules and self-management instructions for themselves and needed explicit instructions in the control of the rules in order to bring their level of performance up to that of four-year-college students (Brown & Day, Note 1).

The more sophisticated students benefitted more from all forms of training and were able to integrate the general self-management and rule training for themselves; therefore there was no difference between the two rules plus self-management conditions. Again this shows that the more

sophisticated students benefit more from training and need less explicit prompts than do the less sophisticated trainees, even though they did not appear to differ on pretraining.

The pattern was repeated with the very difficult invention rule; remember that even four-year-college students only used the rule on 50% of appropriate occasions (Brown & Day, Note 1). The less sophisticated junior college learners improved only, and then only slightly, with the most explicit training. More sophisticated learners improved as a function of explicitness of training, but note that here, with the more difficult rule, it takes the explicit coordination of rules and their control before junior college students perform on a par with four-year-college students.

The general pattern of results is very similar to that found with the much simpler recall-readiness experiment described earlier. The students in the summarization training study (as in the recall-readiness study) did not differ on pretraining, but the more sophisticated students benefitted more from training. Training results in greater use of the rules, and improvement is effected with less explicit instruction with more advanced students. For those students with more severe learning problems, training results in less improvement, and more explicit training is needed before we get any effect of training. The extent of instruction needed to bring about improvement is a sensitive measure of the students' zone of potential development in the training domain; i.e., we learn a great deal about a student's competence by assessing not only his starting level, but his readiness to benefit from instruction (Brown, 1980; Brown & Campione, in press; Brown & French, 1979).

Helping Students Learn to Learn from Texts

The two sets of studies we have used as illustrations, the recall-readiness (Brown, Campione, & Barclay, 1979) and summarization (Day, 1980; Brown & Day, Note 1) training studies, were selected not only for the obvious reason that they were conducted in our laboratory, but also because they are excellent examples of what we can do readily and what we have more difficulty accomplishing. For example, with detailed task analyses, experts' help, and intensive training, we were able to help remedial college students improve their ability to summarize texts. But the texts were very easy for them; i.e., they were texts of fifth-grade readability level and were focused on familiar content. Therefore, instructions to delete trivia met with compliance. If the texts had concentrated on less familiar content or had been more structurally complex, it is not clear that the instruction to delete trivia would be so easy to follow. One must have some background concerning the content knowledge to enable one to recognize trivia readily.

There are two general classes of problems that can impede effective studying: inefficient application of rules and strategies, and impoverished background knowledge. The child may lack the necessary strategies to engage in appropriate learning activities, and we have ample evidence in the literature of children's lack of strategic knowledge. Alternatively, or in addition, the child may lack the requisite knowledge of the world to understand certain texts that presuppose adequate background experience. Instruction aimed at instigating strategic activity is somewhat easier to design than instruction aimed at instilling relevant knowledge, although

unfortunately the two forms of knowledge interact in quite complex ways (Brown, in press; Chi, in press).

Consider, first, instruction in rules and strategies. If adequate performance depends on the application of a set of rules, and these rules can be specified exactly, then it should be possible to design instructional routines that introduce the uninitiated to these possibilities. For example, merely making children aware that they should continue studying and self-testing until ready for a test improves study performance in young children (Brown, Campione, & Barclay, 1979). Instructing students in efficient self-question techniques is also an effective training procedure (André & Anderson, 1978). Sensitizing young readers to the logical structure of text and the inherent meaning in certain passages again helps the less able reader (Bransford, Stein, Shelton, & Owings, 1980). The more detailed understanding the instructor has of effective rules for reading and studying, the more readily can those rules be trained. Our work with summarization rules is a case in point. Merely instructing students to make their summaries as brief as possible, and to omit unnecessary information, was not an explicit enough guide for junior college students. Exact specification of the rules that could be used to achieve this aim, however, was an extremely effective instructional routine. Quite simply, the more we are able to specify the rules used by experts, the more we will be able to successfully instruct the novice.

The second major impediment to effective learning is a deficient knowledge base. If the text deals with topics that the reader is not

familiar with, it will be difficult for him to understand the significance of the material, to select main points and disregard trivia. One has to understand the meaning of the material one is reading to be able to identify just what is important and what is trivial. One answer to this problem is to select texts that do deal with familiar material, but this is not always possible. And, whereas the teacher may actively attempt to provide the requisite background knowledge for a particular text, she cannot always do this. The only answer, then, is to increase the learner's store of information, but this takes time; the only prescription for training that follows a diagnosis of deficient knowledge is one of general enrichment, which few schools have the resources to provide.

Undoubtedly, the task of instructing effective learning from texts is a complex one. But, if we keep in mind the interactive nature of learning, this should provide excellent insights into how we might help students become more effective text processors--despite the admitted difficulties. In Figure 1 we have modified a tetrahedral model of learning adapted from

Insert Figure 1 about here.

Jenkins (1979), Bransford (1979), and Brown (in press) to emphasize its relevance to the task of studying from texts.

Imagine, if you will, a learner considering a learning task from the viewpoint of the center of the tetrahedron. In designing a plan for learning, the four points of the model must be considered. We believe that

this is the end result that cognitive training should strive for. Learners must themselves consider the four points and their interaction--perhaps as follows: (a) Learning Activities: The learner should consider his available strategies, both general and specific. Specific strategies could be the rules for summarization just described, while general strategies could be variants of such general comprehension and study-monitoring activities as generating hypotheses about the text, predicting outcomes, noting and remediating confusions, etc. (Baker & Brown, in press; Brown 1980). (b) Characteristics of the Learner: The learner should also consider his general characteristics, such as his limited immediate memory capacity for meaningless materials and his reservoir of appropriate prior knowledge. Thus, he should not overburden his memory by attempting to retain large segments of texts, too many pending questions, too many unresolved ambiguities, etc. (Baker & Brown, in press). He should attempt to tie the informational content into any prior knowledge he may have, to activate appropriate schemata (Anderson, 1977; Brown, Smiley, Day, Townsend, & Lawton, 1977), to seek relationships or analogies to prior knowledge (Brown, in press; Simon & Hayes, 1976; Gick & Holyoak, Note 2) in order to see the information in the light of knowledge he already has. (c) Nature of the Materials: The learner should also examine the text itself for the logical structure of the material, its form as well as its content (e.g., is it a story, an expository text, a riddle, etc.). Although meaning does not reside in the text alone, authors are sometimes helpful in cueing meaning. They flag important statements by such devices as headings, subsections,

topic sentences, summaries, redundancies and just plain "and now for something really important" statements. Students can be made aware of the significance of these cues and induced to actively seek help from such sources. (d) Criteria Task: The learner should consider the aim of the learning activity, the purpose of his endeavors; he should also be aware that different desired outcomes require different learning activities and thus learn to tailor his efforts accordingly.

As psychologists interested in learning, it is important for us to understand the interactive nature of the tetrahedral model. As psychologists interested in methods for training effective learners, we believe that our main aim is to get the student to understand this point also. What we are advocating is, of course, an avoidance of blind training techniques, and a serious attempt at informed, self-controlled training--to provide novice learners with the information necessary for them to design effective plans of their own. The essential aim of training is to make the trainee more aware of the active nature of learning and the importance of employing problem-solving, trouble-shooting routines to enhance understanding. If learners can be made aware of (a) basic strategies for reading and remembering, (b) simple rules of text construction, (c) differing demands of a variety of tests to which their information may be put, and (d) the importance of activating any background knowledge they may have, they cannot help but become more effective learners. Such self-awareness is a prerequisite for self-regulation, the ability to orchestrate, monitor, and check one's own cognitive activities.

Reference Notes

1. Brown, A. L., & Day, J. D. The development of rules for summarizing texts. Unpublished manuscript, University of Illinois, 1980.
2. Gick, M., & Holyoak, K. Analogical reasoning in adults. Unpublished manuscript, University of Michigan, 1979.

References

- Anderson, R. C. The notion of schemata and the educational enterprise. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.
- André, M. D. A., & Anderson, T. H. The development and evaluation of a self-questioning study technique. Reading Research Quarterly, 1978-79, 14, 605-623.
- Baker, L., & Brown, A. L. Metacognitive skills of reading. In P. D. Pearson (Ed.), Handbook of reading research. New York: Longmans, in press.
- Belmont, J. M., & Butterfield, E. C. The instructional approach to developmental cognitive research. In R. V. Kail, Jr. & J. W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, N.J.: Erlbaum, 1977.
- Belmont, J. M., Butterfield, E. C., & Borkowski, J. G. Training retarded people to generalize memorization methods across memory tasks. In M. M. Gruneberg, P. E. Morris, & R. N. Sykes (Eds.), Practical aspects of memory. London: Academic Press, 1978.
- Bransford, J. D. Human cognition: Learning, understanding and remembering. Belmont, Calif.: Wadsworth, 1979.

- Bransford, J. D., Stein, B. S., Shelton, T. S., & Owings, R. A. Cognition and adaptation: The importance of learning to learn. In J. Harvey (Ed.), Cognition, social behavior and the environment. Hillsdale, N.J.: Erlbaum, 1980.
- Brown, A. L. The role of strategic behavior in retarded memory. In N. R. Ellis (Ed.), International review of research in mental retardation (Vol. 7). New York: Academic Press, 1974.
- Brown, A. L. The development of memory: Knowing, knowing about knowing, and knowing how to know. In H. W. Reese (Ed.), Advances in child development and behavior (Vol. 10). New York: Academic Press, 1975.
- Brown, A. L. Development, schooling and the acquisition of knowledge about knowledge. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.
- Brown, A. L. Knowing when, where and how to remember: A problem of metacognition. In R. Glaser (Ed.), Advances in instructional psychology. Hillsdale, N.J.: Erlbaum, 1978.
- Brown, A. L. Knowing when, where, and how to remember: Activity, growth and knowledge. In L. S. Cermak & F. I. M. Craik (Eds.), Levels of processing in human memory. Hillsdale, N.J.: Erlbaum, 1979.
- Brown, A. L. Metacognitive development and reading. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), Theoretical issues in reading comprehension. Hillsdale, N.J.: Erlbaum, 1980.

- Brown, A. L. Learning and development: The problems of compatibility, access and induction. Human Development, in press.
- Brown, A. L., & Campione, J. C. Permissible inferences from the outcome of training studies in cognitive development research. Quarterly Newsletter of the Institute for Comparative Human Development, 1978, 2, 46-53.
- Brown, A. L., & Campione, J. C. Inducing flexible thinking: A problem of access. To appear in M. Friedman, J. P. Das, & N. O'Connor (Eds.), Intelligence and learning. New York: Plenum Press, in press.
- Brown, A. L., Campione, J. C., & Barclay, C. R. Training self-checking routines for estimating test readiness: Generalization from list learning to prose recall. Child Development, 1979, 50, 501-512.
- Brown, A. L. & DeLoache, J. S. Skills, plans and self-regulation. In R. Siegler (Ed.), Carnegie-Mellon symposium on cognition. Hillsdale, N.J.: Erlbaum, 1978.
- Brown, A. L., & French, L. A. The zone of potential development: Implications for intelligence testing in the year 2000. Intelligence, 1979, 3, 255-277.
- Brown, A. L., Smiley, S. S., Day, J., Townsend, M. & Lawton, S. C. Intrusion of a thematic idea in children's recall of prose. Child Development, 1977, 48, 1454-1466.

Burger, A. L., Blackman, L. S., Holmes, M., & Zetlin, A. Use of active sorting and retrieval strategies as a facilitator of recall, clustering, and sorting by EMR and nonretarded children. American Journal of Mental Deficiency, 1978, 83, 253-261.

Campione, J. C., & Brown, A. L. The effects of contextual changes and degree of component mastery in transfer of training. In H. W. Reese (Ed.), Advances in child development and behavior (Vol. 9). New York: Academic Press, 1974.

Campione, J. C., & Brown, A. L. Memory and metamemory development in educable retarded children. In R. V. Kail, Jr. & J. W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, N.J.: Erlbaum, 1977.

Chi, M. T. H. Knowledge development and memory performance. To appear in M. Friedman, J. P. Das, & N. O'Connor (Eds.), Intelligence and learning. New York: Plenum Press, in press.

Day, J. D. Training summarization skills: A comparison of teaching methods. Unpublished doctoral dissertation, University of Illinois, 1980.

Flavell, J. H., Friedrichs, A. G., & Hoyt, J. D. Developmental changes in memorization processes. Cognitive Psychology, 1970, 1, 324-340.

Flavell, J. H., & Wellman, H. M. Metamemory. In R. V. Kail, Jr. & J. W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, N.J.: Erlbaum, 1977.

- Gerjuoy, I. R., & Spitz, H. Associative clustering in free recall: Intellectual and developmental variables. American Journal of Mental Deficiency, 1966, 70, 918-927.
- Green, J. M. Category cues in free recall: Retarded adults of two vocabulary age levels. American Journal of Mental Deficiency, 1974, 78, 419-425.
- Jenkins, J. J. Four points to remember: A tetrahedral model and memory experiments. In L. S. Cermak, & F. I. M. Craik (Eds.), Levels and processing in human memory. Hillsdale, N.J.: Erlbaum, 1979.
- Kennedy, B. A., & Miller, D. J. Persistent use of verbal rehearsal as a function of information about its value. Child Development, 1976, 47, 566-569.
- Kintsch, W., & van Dijk, T. A. Toward a model of text comprehension and production. Psychological Review, 1978, 85, 363-394.
- Mayer, R. E., & Greeno, J. G. Structural differences between learning outcomes produced by different instructional methods. Journal of Educational Psychology, 1972, 63, 165-173.
- Murphy, M. D., & Brown, A. L. Incidental learning in preschool children as a function of level of cognitive analysis. Journal of Experimental Child Psychology, 1975, 19, 509-523.
- Nitsch, K. E. Structuring decontextualized forms of knowledge. Unpublished doctoral dissertation, Vanderbilt University, 1977.

- Resnick, L. B., & Glaser, R. Problem solving and intelligence. In
L. B. Resnick (Ed.), The nature of intelligence. Hillsdale, N.J.:
Erlbaum, 1976.
- Ringel, B. A., & Springer, C. J. On knowing how well one is remembering:
The persistence of strategy use during transfer. Journal of
Experimental Child Psychology, 1980, 29, 322-333.
- Siegler, R. S. Developmental sequences within and between concepts.
Society for Research in Child Development Monograph Series, in press.
- Simon, H. A., & Hayes, J. R. The understanding process: Problem isomorphs.
Cognitive Psychology, 1976, 8, 165-190.
- Turnure, J. E., Buium, N., & Thurlow, M. L. The effectiveness of
interrogatives for promoting verbal elaboration productivity in young
children. Child Development, 1976, 47, 851-855.
- Vygotsky, L. S. Mind in society: The development of higher psychological
processes (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.
and trans.). Cambridge, Mass.: Harvard University Press, 1978.

Footnote

This paper is based on an invited address given by the first author at the annual meetings of the American Educational Research Association in Boston, April 1980. Preparation of the manuscript was supported in part by Grants HD 05951, HD 06864, and Research Career Development Award HD 00111 from the National Institute of Child Health and Human Development; and in part by the National Institute of Education under Contract No. HEW-NIE-C-400-76-0116.

We would like to extend our especial appreciation to Mrs. Wilma Noynaert, assistant director of special education for the Peoria Public Schools. Without her continual support and advice, this research would not have been possible. Thanks are also due to Mr. William Jordan, principal, and the teachers of Von Steuben School, and to Mr. Lee Nugent, principal, and teachers of the Hines School, both in Peoria, Illinois, for their generous and willing cooperation. We would like to thank Mrs. Carolyn Long for her patience and skill in testing the children, day after day, over a long period, and the children themselves for their willing and active participation.

We would also like to extend our appreciation to Dr. William McNett, chairman of the English department, and Dr. Karl Taylor and Mrs. Jan Schmidt, English teachers at Illinois Central College, for their generous and willing cooperation.

Figure Caption

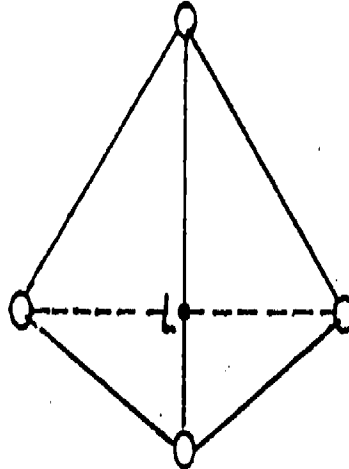
Figure 1. An organizational framework for exploring questions about learning from texts.

CHARACTERISTICS OF THE LEARNER

BYPASS CAPACITY LIMITATIONS,
ACTIVATE AVAILABLE KNOWLEDGE,
REASON BY ANALOGY, ETC.

LEARNING ACTIVITIES

STRATEGIES, RULES, PROCEDURES,
MONITOR COMPREHENSION,
MACRORULES, ETC.



CRITERIAL TASKS

GIST VS. VERBATIM RECALL,
GENERALIZED RULE USE,
RESOLVING AMBIGUITIES,
FOLLOWING INSTRUCTIONS, ETC.

NATURE OF THE MATERIALS

TEXT STRUCTURE, COHESION,
LOGICAL CONTENT,
AUTHOR'S EXPLICIT CUES, ETC.

CENTER FOR THE STUDY OF READING

READING EDUCATION REPORTS

- No. 1: Durkin, D. *Comprehension Instruction—Where are You?*, October 1977. (ERIC Document Reproduction Service No. ED 146 566, 14p., PC-\$1.82, MF-.83)
- No. 2: Asher, S. R. *Sex Differences in Reading Achievement*, October 1977. (ERIC Document Reproduction Service No. ED 146 567, 30p., PC-\$3.32, MF-.83)
- No. 3: Adams, M. J., Anderson, R. C., & Durkin, D. *Beginning Reading: Theory and Practice*, November 1977. (ERIC Document Reproduction Service No. ED 151 722, 15p., PC-\$1.82, MF-.83)
- No. 4: Jenkins, J. R., & Pany, D. *Teaching Reading Comprehension in the Middle Grades*, January 1978. (ERIC Document Reproduction Service No. ED 151 756, 36p., PC-\$3.32, MF-.83)
- No. 5: Bruce, B. *What Makes a Good Story?*, June 1978. (ERIC Document Reproduction Service No. ED 158 222, 16p., PC-\$1.82, MF-.83)
- No. 6: Anderson, T. H. *Another Look at the Self-Questioning Study Technique*, September 1978. (ERIC Document Reproduction Service No. ED 163 441, 19p., PC-\$1.82, MF-.83)
- No. 7: Pearson, P. D., & Kamil, M. L. *Basic Processes and Instructional Practices in Teaching Reading*, December 1978. (ERIC Document Reproduction Service No. ED 165 118, 29p., PC-\$3.32, MF-.83)
- No. 8: Collins, A., & Haviland, S. E. *Children's Reading Problems*, June 1979. (ERIC Document Reproduction Service No. ED 172 188, 19p., PC-\$1.82, MF-.83)
- No. 9: Schallert, D. L., & Kleiman, G. M. *Some Reasons Why Teachers are Easier to Understand than Textbooks*, June 1979. (ERIC Document Reproduction Service No. ED 172 189, 17p., PC-\$1.82, MF-.83)
- No. 10: Baker, L. *Do I Understand or Do I not Understand: That is the Question*, July 1979. (ERIC Document Reproduction Service No. ED 174 948, 27p., PC-\$3.32, MF-.83)
- No. 11: Anderson, R. C., & Freebody, P. *Vocabulary Knowledge and Reading*, August 1979. (ERIC Document Reproduction Service No. ED 177 470, 52p., PC-\$4.82, MF-.83)
- No. 12: Joag-dev, C., & Steffensen, M. S. *Studies of the Bicultural Reader: Implications for Teachers and Librarians*, January 1980. (ERIC Document Reproduction Service No. ED 181 430, 28p., PC-\$3.32, MF-.83)
- No. 13: Adams, M., & Bruce, B. *Background Knowledge and Reading Comprehension*, January 1980. (ERIC Document Reproduction Service No. ED 181 431, 48p., PC-\$3.32, MF-.83)
- No. 14: Rubin, A. *Making Stories, Making Sense* (includes a response by T. Raphael and J. LaZansky), January 1980. (ERIC Document Reproduction Service No. ED 181 432, 42p., PC-\$3.32, MF-.83)
- No. 15: Tierney, R. J., & LaZansky, J. *The Rights and Responsibilities of Readers and Writers: A Contractual Agreement* (includes responses by R. N. Kantor and B. B. Armbruster), January 1980. (ERIC Document Reproduction Service No. ED 181 447, 32p., PC-\$3.32, MF-.83)
- No. 16: Anderson, T. H., Armbruster, B. B., & Kantor, R. N. *How Clearly Written are Children's Textbooks? Or, Of Bladderworts and Alfa* (includes a response by M. Kane, Senior Editor, Ginn and Company), August 1980.
- No. 17: Tierney, R. J., Mosenthal, J., & Kantor, R. N. *Some Classroom Applications of Text Analysis: Toward Improving Text Selection and Use*, August 1980.
- No. 18: Steinberg, C., & Bruce, B. *Higher-Level Features in Children's Stories: Rhetorical Structure and Conflict*, October 1980.
- No. 19: Durkin, D. *What is the Value of the New Interest in Reading Comprehension?*, November 1980.

CENTER FOR THE STUDY OF READING

TECHNICAL REPORTS

- No. 1: Halff, H. M. *Graphical Evaluation of Hierarchical Clustering Schemes*, October 1975. (ERIC Document Reproduction Service No. ED 134 926, 11p., PC:\$1.82, MF:\$83)
- No. 2: Spiro, R. J. *Inferential Reconstruction in Memory for Connected Discourse*, October 1975. (ERIC Document Reproduction Service No. ED 136 187, 81p., PC:\$6.32, MF:\$83)
- No. 3: Goetz, E. T. *Sentences in Lists and in Connected Discourse*, November 1975. (ERIC Document Reproduction Service No. ED 134 927, 75p., PC:\$4.82, MF:\$83)
- No. 4: Alessi, S. M., Anderson, T. H., & Biddle, W. B. *Hardware and Software Considerations in Computer Based Course Management*, November 1975. (ERIC Document Reproduction Service No. ED 134 928, 21p., PC:\$1.82, MF:\$83)
- No. 5: Schallert, D. L. *Improving Memory for Prose: The Relationship between Depth of Processing and Context*, November 1975. (ERIC Document Reproduction Service No. ED 134 929, 37p., PC:\$3.32, MF:\$83)
- No. 6: Anderson, R. C., Goetz, E. T., Pichert, J. W., & Halff, H. M. *Two Faces of the Conceptual Peg Hypothesis*, January 1976. (ERIC Document Reproduction Service No. ED 134 930, 29p., PC:\$3.32, MF:\$83)
- No. 7: Ortony, A. *Names, Descriptions, and Pragmatics*, February 1976. (ERIC Document Reproduction Service No. ED 134 931, 25p., PC:\$1.82, MF:\$83)
- No. 8: Mason, J. M. *Questioning the Notion of Independent Processing Stages in Reading*, February 1976. (*Journal of Educational Psychology*, 1977, 69, 288-297)
- No. 9: Siegel, M. A. *Teacher Behaviors and Curriculum Packages: Implications for Research and Teacher Education*, April 1976. (ERIC Document Reproduction Service No. ED 134 932, 42p., PC:\$3.32, MF:\$83)
- No. 10: Anderson, R. C., Pichert, J. W., Goetz, E. T., Schallert, D. L., Stevens, K. C., & Trollip, S. R. *Instantiation of General Terms*, March 1976. (ERIC Document Reproduction Service No. ED 134 933, 30p., PC:\$3.32, MF:\$83)
- No. 11: Armbruster, B. B. *Learning Principles from Prose: A Cognitive Approach Based on Schema Theory*, July 1976. (ERIC Document Reproduction Service No. ED 134 934, 48p., PC:\$3.32, MF:\$83)
- No. 12: Anderson, R. C., Reynolds, R. E., Schallert, D. L., & Goetz, E. T. *Frameworks for Comprehending Discourse*, July 1976. (ERIC Document Reproduction Service No. ED 134 935, 33p., PC:\$3.32, MF:\$83)
- No. 13: Rubin, A. D., Bruce, B. C., & Brown, J. S. *A Process-Oriented Language for Describing Aspects of Reading Comprehension*, November 1976. (ERIC Document Reproduction Service No. ED 136 188, 41p., PC:\$3.32, MF:\$83)
- No. 14: Pichert, J. W., & Anderson, R. C. *Taking Different Perspectives on a Story*, November 1976. (ERIC Document Reproduction Service No. ED 134 936, 30p., PC:\$3.32, MF:\$83)
- No. 15: Schwartz, R. M. *Strategic Processes in Beginning Reading*, November 1976. (ERIC Document Reproduction Service No. ED 134 937, 19p., PC:\$1.82, MF:\$83)
- No. 16: Jenkins, J. R., & Pany, D. *Curriculum Biases in Reading Achievement Tests*, November 1976. (ERIC Document Reproduction Service No. ED 134 938, 24p., PC:\$1.82, MF:\$83)
- No. 17: Asher, S. R., Hymel, S., & Wigfield, A. *Children's Comprehension of High- and Low-Interest Material and a Comparison of Two Cloze Scoring Methods*, November 1976. (ERIC Document Reproduction Service No. ED 134 939, 32p., PC:\$3.32, MF:\$83)
- No. 18: Brown, A. L., Smiley, S. S., Day, J. D., Townsend, M. A. R., & Lawton, S. C. *Intrusion of a Thematic Idea in Children's Comprehension and Retention of Stories*, December 1976. (ERIC Document Reproduction Service No. ED 136 189, 39p., PC:\$3.32, MF:\$83)
- No. 19: Kleiman, G. M. *The Prelinguistic Cognitive Basis of Children's Communicative Intentions*, February 1977. (ERIC Document Reproduction Service No. ED 134 940, 51p., PC:\$4.82, MF:\$83)
- No. 20: Kleiman, G. M. *The Effect of Previous Context on Reading Individual Words*, February 1977. (ERIC Document Reproduction Service No. ED 134 941, 76p., PC:\$6.32, MF:\$83)
- No. 21: Kane, J. H., & Anderson, R. C. *Depth of Processing and Interference Effects in the Learning and Remembering of Sentences*, February 1977. (ERIC Document Reproduction Service No. ED 134 942, 29p., PC:\$3.32, MF:\$83)

- No. 22: Brown, A. L., & Campione, J. C. *Memory Strategies in Learning: Training Children to Study Strategically*, March 1977. (ERIC Document Reproduction Service No. ED 136 234, 54p., PC-\$4.82, MF-\$83)
- No. 23: Smiley, S. S., Oakley, D. D., Worthen, D., Campione, J. C., & Brown, A. L. *Recall of Thematically Relevant Material by Adolescent Good and Poor Readers as a Function of Written Versus Oral Presentation*, March 1977. (ERIC Document Reproduction Service No. ED 136 235, 23p., PC-\$1.82, MF-\$83)
- No. 24: Anderson, R. C., Spiro, R. J., & Anderson, M. C. *Schemata as Scaffolding for the Representation of Information in Connected Discourse*, March 1977. (ERIC Document Reproduction Service No. ED 136 236, 18p., PC-\$1.82, MF-\$83)
- No. 25: Pany, D., & Jenkins, J. R. *Learning Word Meanings: A Comparison of Instructional Procedures and Effects on Measures of Reading Comprehension with Learning Disabled Students*, March 1977. (ERIC Document Reproduction Service No. ED 136 237, 34p., PC-\$3.32, MF-\$83)
- No. 26: Armbruster, B. B., Stevens, R. J., & Rosenshine, B. *Analyzing Content Coverage and Emphasis: A Study of Three Curricula and Two Tests*, March 1977. (ERIC Document Reproduction Service No. ED 136 238, 22p., PC-\$1.82, MF-\$83)
- No. 27: Ortony, A., Reynolds, R. E., & Arter, J. A. *Metaphor: Theoretical and Empirical Research*, March 1977. (ERIC Document Reproduction Service No. ED 137 752, 63p., PC-\$4.82, MF-\$83)
- No. 28: Ortony, A. *Remembering and Understanding Jabberwocky and Small-Talk*, March 1977. (ERIC Document Reproduction Service No. ED 137 753, 36p., PC-\$3.32, MF-\$83)
- No. 29: Schallert, D. L., Kleiman, G. M., & Rubin, A. D. *Analyses of Differences between Written and Oral Language*, April 1977. (ERIC Document Reproduction Service No. ED 144 038, 33p., PC-\$3.32, MF-\$83)
- No. 30: Goetz, E. T., & Osborn, J. *Procedures for Sampling Texts and Tasks in Kindergarten through Eighth Grade*, April 1977. (ERIC Document Reproduction Service No. ED 146 565, 80p., PC-\$6.32, MF-\$83)
- No. 31: Nash-Webber, B. *Anaphora: A Cross-Disciplinary Survey*, April 1977. (ERIC Document Reproduction Service No. ED 144 039, 43p., PC-\$3.32, MF-\$83)
- No. 32: Adams, M. J., & Collins, A. *A Schema-Theoretic View of Reading Comprehension*, April 1977. (ERIC Document Reproduction Service No. ED 142 971, 49p., PC-\$3.32, MF-\$83)
- No. 33: Huggins, A. W. F. *Syntactic Aspects of Reading Comprehension*, April 1977. (ERIC Document Reproduction Service No. ED 142 972, 68p., PC-\$4.82, MF-\$83)
- No. 34: Bruce, B. C. *Plans and Social Actions*, April 1977. (ERIC Document Reproduction Service No. ED 149 328, 45p., PC-\$3.32, MF-\$83)
- No. 35: Rubin, A. D. *A Theoretical Taxonomy of the Differences between Oral and Written Language*, January 1978. (ERIC Document Reproduction Service No. ED 150 550, 61p., PC-\$4.82, MF-\$83)
- No. 36: Nash-Webber, B., & Reiter, R. *Anaphora and Logical Form: On Formal Meaning Representation for Natural Language*, April 1977. (ERIC Document Reproduction Service No. ED 142 973, 42p., PC-\$3.32, MF-\$83)
- No. 37: Adams, M. J. *Failures to Comprehend and Levels of Processing in Reading*, April 1977. (ERIC Document Reproduction Service No. ED 145 410, 51p., PC-\$4.82, MF-\$83)
- No. 38: Woods, W. A. *Multiple Theory Formation in High-Level Perception*, April 1977. (ERIC Document Reproduction Service No. ED 144 020, 58p., PC-\$4.82, MF-\$83)
- No. 40: Collins, A., Brown, J. S., & Larkin, K. M. *Inference in Text Understanding*, December 1977. (ERIC Document Reproduction Service No. ED 150 547, 48p., PC-\$3.32, MF-\$83)
- No. 41: Anderson, R. C., & Pichert, J. W. *Recall of Previously Unrecallable Information Following a Shift in Perspective*, April 1977. (ERIC Document Reproduction Service No. ED 142 974, 27p., PC-\$3.32, MF-\$83)
- No. 42: Mason, J., Osborn, J., & Rosenshine, B. *A Consideration of Skill Hierarchy Approaches to the Teaching of Reading*, December 1977. (ERIC Document Reproduction Service No. ED 150 549, 176p., PC-\$12.32, MF-\$83)
- No. 43: Collins, A., Brown, A. L., Morgan, J. L., & Brewer, W. F. *The Analysis of Reading Tasks and Texts*, April 1977. (ERIC Document Reproduction Service No. ED 145 404, 96p., PC-\$6.32, MF-\$83)
- No. 44: McClure, E. *Aspects of Code-Switching in the Discourse of Bilingual Mexican-American Children*, April 1977. (ERIC Document Reproduction Service No. ED 142 975, 38p., PC-\$3.32, MF-\$83)
- No. 45: Schwartz, R. M. *Relation of Context Utilization and Orthographic Automaticity in Word Identification*, May 1977. (ERIC Document Reproduction Service No. ED 137 762, 27p., PC-\$3.32, MF-\$83)

- No. 46: Anderson, R. C., Stevens, K. C., Shiffrin, Z., & Osborn, J. *Instantiation of Word Meanings in Children*, May 1977. (ERIC Document Reproduction Service No. ED 142 976, 22p., PC-\$1.82, MF-\$83)
- No. 47: Brown, A. L. *Knowing When, Where, and How to Remember: A Problem of Metacognition*, June 1977. (ERIC Document Reproduction Service No. ED 146 562, 152p., PC-\$10.82, MF-\$83)
- No. 48: Brown, A. L., & DeLoache, J. S. *Skills, Plans, and Self-Regulation*, July 1977. (ERIC Document Reproduction Service No. ED 144 040, 66p., PC-\$4.82, MF-\$83)
- No. 49: Goetz, E. T. *Inferences in the Comprehension of and Memory for Text*, July 1977. (ERIC Document Reproduction Service No. ED 150 548, 97p., PC-\$6.32, MF-\$83)
- No. 50: Anderson, R. C. *Schema-Directed Processes in Language Comprehension*, July 1977. (ERIC Document Reproduction Service No. ED 142 977, 33p., PC-\$3.32, MF-\$83)
- No. 51: Brown, A. L. *Theories of Memory and the Problems of Development: Activity, Growth, and Knowledge*, July 1977. (ERIC Document Reproduction Service No. ED 144 041, 59p., PC-\$4.82, MF-\$83)
- No. 52: Morgan, J. L. *Two Types of Convention in Indirect Speech Acts*, July 1977. (ERIC Document Reproduction Service No. ED 145 405, 40p., PC-\$3.32, MF-\$83)
- No. 53: Brown, A. L., Smiley, S. S., & Lawton, S. C. *The Effects of Experience on the Selection of Suitable Retrieval Cues for Studying from Prose Passages*, July 1977. (ERIC Document Reproduction Service No. ED 144 042, 30p., PC-\$3.32, MF-\$83)
- No. 54: Fleisher, L. S., & Jenkins, J. R. *Effects of Contextualized and Decontextualized Practice Conditions on Word Recognition*, July 1977. (ERIC Document Reproduction Service No. ED 144 043, 37p., PC-\$3.32, MF-\$83)
- No. 55: Jenkins, J. R., & Larson, K. *Evaluating Error Correction Procedures for Oral Reading*, June 1978. (ERIC Document Reproduction Service No. ED 158 224, 34p., PC-\$3.32, MF-\$83)
- No. 56: Anderson, T. H., Standiford, S. N., & Alessi, S. M. *Computer Assisted Problem Solving in an Introductory Statistics Course*, August 1977. (ERIC Document Reproduction Service No. ED 146 563, 26p., PC-\$3.32, MF-\$83)
- No. 57: Barnitz, J. *Interrelationship of Orthography and Phonological Structure in Learning to Read*, August 1977. (ERIC Document Reproduction Service No. ED 150 546, 62p., PC-\$4.82, MF-\$83)
- No. 58: Mason, J. M. *The Role of Strategy in Reading in the Mentally Retarded*, September 1977. (ERIC Document Reproduction Service No. ED 145 406, 28p., PC-\$3.32, MF-\$83)
- No. 59: Mason, J. M. *Reading Readiness: A Definition and Skills Hierarchy from Preschoolers' Developing Conceptions of Print*, September 1977. (ERIC Document Reproduction Service No. ED 145 403, 57p., PC-\$4.82, MF-\$83)
- No. 60: Spiro, R. J., & Esposito, J. J. *Superficial Processing of Explicit Inferences in Text*, December 1977. (ERIC Document Reproduction Service No. ED 150 545, 27p., PC-\$3.32, MF-\$83)
- No. 65: Brewer, W. F. *Memory for the Pragmatic Implications of Sentences*, October 1977. (ERIC Document Reproduction Service No. ED 146 564, 27p., PC-\$3.32, MF-\$83)
- No. 66: Brown, A. L., & Smiley, S. S. *The Development of Strategies for Study Prose Passages*, October 1977. (ERIC Document Reproduction Service No. ED 145 371, 59p., PC-\$4.82, MF-\$83)
- No. 68: Stein, N. L., & Nezworski, T. *The Effects of Organization and Instructional Set on Story Memory*, January 1978. (ERIC Document Reproduction Service No. ED 149 327, 41p., PC-\$3.32, MF-\$83)
- No. 69: Stein, N. L. *How Children Understand Stories: A Developmental Analysis*, March 1978. (ERIC Document Reproduction Service No. ED 153 205, 68p., PC-\$4.82, MF-\$83)
- No. 76: Thieman, T. J., & Brown, A. L. *The Effects of Semantic and Formal Similarity on Recognition Memory for Sentences in Children*, November 1977. (ERIC Document Reproduction Service No. ED 150 551, 26p., PC-\$3.32, MF-\$83)
- No. 77: Nash-Webber, B. L. *Inferences in an Approach to Discourse Anaphora*, January 1978. (ERIC Document Reproduction Service No. ED 150 552, 30p., PC-\$3.32, MF-\$83)
- No. 78: Gentner, D. *On Relational Meaning: The Acquisition of Verb Meaning*, December 1977. (ERIC Document Reproduction Service No. ED 149 325, 46p., PC-\$3.32, MF-\$83)
- No. 79: R  yer, J. M. *Theories of Learning Transfer*, January 1978. (ERIC Document Reproduction Service No. ED 149 326, 55p., PC-\$4.82, MF-\$83)
- No. 80: Arter, J. A., & Jenkins, J. R. *Differential Diagnosis-Prescriptive Teaching: A Critical Appraisal*, January 1978. (ERIC Document Reproduction Service No. ED 150 578, 104p., PC-\$7.82, MF-\$83)
- No. 81: Shoben, E. J. *Choosing a Model of Sentence Picture Comparisons: A Reply to Catlin and Jones*, February 1978. (ERIC Document Reproduction Service No. ED 150 577, 30p., PC-\$3.32, MF-\$83)

- No. 82: Steffensen, M. S. *Bereiter and Englemann Reconsidered: The Evidence from Children Acquiring Black English Vernacular*, March 1978. (ERIC Document Reproduction Service No. ED 153 204, 31p., PC-\$3.32, MF-\$83)
- No. 83: Reynolds, R. E., Standiford, S. N., & Anderson, R. C. *Distribution of Reading Time When Questions are Asked about a Restricted Category of Text Information*, April 1978. (ERIC Document Reproduction Service No. ED 153 206, 34p., PC-\$3.32, MF-\$83)
- No. 84: Baker, L. *Processing Temporal Relationships in Simple Stories: Effects of Input Sequence*, April 1978. (ERIC Document Reproduction Service No. ED 157 016, 54p., PC-\$4.82, MF-\$83)
- No. 85: Mason, J. M., Knisely, E., & Kendall, J. *Effects of Polysemous Words on Sentence Comprehension*, May 1978. (ERIC Document Reproduction Service No. ED 157 015, 34p., PC-\$3.32, MF-\$83)
- No. 86: Anderson, T. H., Wardrop, J. L., Hively W., Muller, K. E., Anderson, R. I., Hastings, C. N., & Fredericksen, J. *Development and Trial of a Model for Developing Domain Referenced Tests of Reading Comprehension*, May 1978. (ERIC Document Reproduction Service No. ED 157 036, 69p., PC-\$4.82, MF-\$83)
- No. 87: Andre, M. E. D. A., & Anderson, T. H. *The Development and Evaluation of a Self-Questioning Study Technique*, June 1978. (ERIC Document Reproduction Service No. ED 157 037, 37p., PC-\$3.32, MF-\$83)
- No. 88: Bruce, B. C., & Newman, D. *Interacting Plans*, June 1978. (ERIC Document Reproduction Service No. ED 157 038, 100p., PC-\$6.32, MF-\$83)
- No. 89: Bruce, B. C., Collins, A., Rubin, A. D., & Gentner, D. *A Cognitive Science Approach to Writing*, June 1978. (ERIC Document Reproduction Service No. ED 157 039, 57p., PC-\$4.82, MF-\$83)
- No. 90: Asher, S. R. *Referential Communication*, June 1978. (ERIC Document Reproduction Service No. ED 159 597, 71p., PC-\$4.82, MF-\$83)
- No. 91: Royer, J. M., & Cunningham, D. J. *On the Theory and Measurement of Reading Comprehension*, June 1978. (ERIC Document Reproduction Service No. ED 157 040, 63p., PC-\$4.82, MF-\$83)
- No. 92: Mason, J. M., Kendall, J. R. *Facilitating Reading Comprehension Through Text Structure Manipulation*, June 1978. (ERIC Document Reproduction Service No. ED 157 041, 36p., PC-\$3.32, MF-\$83)
- No. 93: Ortony, A., Schallert, D. L., Reynolds, R. E., & Antos, S. J. *Interpreting Metaphors and Idioms: Some Effects of Context on Comprehension*, July 1978. (ERIC Document Reproduction Service No. ED 157 042, 41p., PC-\$3.32, MF-\$83)
- No. 94: Brown, A. L., Campione, J. C., & Barclay, C. R. *Training Self-Checking Routines for Estimating Test Readiness: Generalization from List Learning to Prose Recall*, July 1978. (ERIC Document Reproduction Service No. ED 158 226, 41p., PC-\$3.32, MF-\$83)
- No. 95: Reichman, R. *Conversational Coherency*, July 1978. (ERIC Document Reproduction Service No. ED 159 658, 86p., PC-\$6.32, MF-\$83)
- No. 96: Wigfield, A., & Asher, S. R. *Age Differences in Children's Referential Communication Performance: An Investigation of Task Effects*, July 1978. (ERIC Document Reproduction Service No. ED 159 659, 31p., PC-\$3.32, MF-\$83)
- No. 97: Steffensen, M. S., Jogdeo, C., & Anderson, R. C. *A Cross-Cultural Perspective on Reading Comprehension*, July 1978. (ERIC Document Reproduction Service No. ED 159 660, 41p., PC-\$3.32, MF-\$83)
- No. 98: Green, G. M. *Discourse Functions of Inversion Construction*, July 1978. (ERIC Document Reproduction Service No. ED 160 998, 42p., PC-\$3.32, MF-\$83)
- No. 99: Asher, S. R. *Influence of Topic Interest on Black Children and White Children's Reading Comprehension*, July 1978. (ERIC Document Reproduction Service No. ED 159 661, 35p., PC-\$3.32, MF-\$83)
- No. 100: Jenkins, J. R., Pany, D., & Schreck, J. *Vocabulary and Reading Comprehension: Instructional Effects*, August 1978. (ERIC Document Reproduction Service No. ED 160 999, 50p., PC-\$3.32, MF-\$83)
- No. 101: Shoben, E. J., Rips, L. J., & Smith, E. E. *Issues in Semantic Memory: A Response to Glass and Holyoak*, August 1978. (ERIC Document Reproduction Service No. ED 159 662, 85p., PC-\$6.32, MF-\$83)
- No. 102: Baker, L., & Stein, N. L. *The Development of Prose Comprehension Skills*, September 1978. (ERIC Document Reproduction Service No. ED 159 663, 69p., PC-\$4.82, MF-\$83)
- No. 103: Fleisher, L. S., Jenkins, J. R., & Pany, D. *Effects on Poor Readers' Comprehension of Training in Rapid Decoding*, September 1978. (ERIC Document Reproduction Service No. ED 159 664, 39p., PC-\$3.32, MF-\$83)

- No. 104: Anderson, T. H. *Study Skills and Learning Strategies*, September 1978. (ERIC Document Reproduction Service No. ED 161 000, 41p., PC-\$3.32, MF-\$83)
- No. 105: Ortony, A. *Beyond Literal Similarity*, October 1978. (ERIC Document Reproduction Service No. ED 166 635, 58p., PC-\$4.82, MF-\$83)
- No. 106: Durkin, D. *What Classroom Observations Reveal about Reading Comprehension Instruction*, October 1978. (ERIC Document Reproduction Service No. ED 162 259, 94p., PC-\$6.32, MF-\$83)
- No. 107: Adams, M. J. *Models of Word Recognition*, October 1978. (ERIC Document Reproduction Service No. ED 163 431, 93p., PC-\$6.32, MF-\$83)
- No. 108: Reder, L. M. *Comprehension and Retention of Prose: A Literature Review*, November 1978. (ERIC Document Reproduction Service No. ED 165 114, 116p., PC-\$7.82, MF-\$83)
- No. 109: Wardrop, J. L., Anderson, T. H., Hively, W., Anderson, R. I., Hastings, C. N., & Muller, K. E. *A Framework for Analyzing Reading Test Characteristics*, December 1978. (ERIC Document Reproduction Service No. ED 165 117, 65p., PC-\$4.82, MF-\$83)
- No. 110: Tirre, W. C., Manelis, L., & Leicht, K. L. *The Effects of Imaginal and Verbal Strategies on Prose Comprehension in Adults*, December 1978. (ERIC Document Reproduction Service No. ED 165 116, 27p., PC-\$3.32, MF-\$83)
- No. 111: Spiro, R. J., & Tirre, W. C. *Individual Differences in Schema Utilization During Discourse Processing*, January 1979. (ERIC Document Reproduction Service No. ED 166 651, 29p., PC-\$3.32, MF-\$83)
- No. 112: Ortony, A. *Some Psycholinguistic Aspects of Metaphor*, January 1979. (ERIC Document Reproduction Service No. ED 165 115, 38p., PC-\$3.32, MF-\$83)
- No. 113: Antos, S. J. *Processing Facilitation in a Lexical Decision Task*, January 1979. (ERIC Document Reproduction Service No. ED 165 129, 84p., PC-\$6.32, MF-\$83)
- No. 114: Gentner, D. *Semantic Integration at the Level of Verb Meaning*, February 1979. (ERIC Document Reproduction Service No. ED 165 130, 39p., PC-\$3.32, MF-\$83)
- No. 115: Gearhart, M., & Hall, W. S. *Internal State Words: Cultural and Situational Variation in Vocabulary Usage*, February 1979. (ERIC Document Reproduction Service No. ED 165 131, 66p., PC-\$4.82, MF-\$83)
- No. 116: Pearson, P. D., Hansen, J., & Gordon, C. *The Effect of Background Knowledge on Young Children's Comprehension of Explicit and Implicit Information*, March 1979. (ERIC Document Reproduction Service No. ED 169 521, 26p., PC-\$3.32, MF-\$83)
- No. 117: Barnitz, J. G. *Reading Comprehension of Pronoun-Referent Structures by Children in Grades Two, Four, and Six*, March 1979. (ERIC Document Reproduction Service No. ED 170 731, 51p., PC-\$4.82, MF-\$83)
- No. 118: Nicholson, T., Pearson, P. D., & Dykstra, R. *Effects of Embedded Anomalies and Oral Reading Errors on Children's Understanding of Stories*, March 1979. (ERIC Document Reproduction Service No. ED 169 524, 43p., PC-\$3.32, MF-\$83)
- No. 119: Anderson, R. C., Pichert, J. W., & Shirey, L. L. *Effects of the Reader's Schema at Different Points in Time*, April 1979. (ERIC Document Reproduction Service No. ED 169 523, 36p., PC-\$3.32, MF-\$83)
- No. 120: Canney, G., & Winograd, P. *Schemata for Reading and Reading Comprehension Performance*, April 1979. (ERIC Document Reproduction Service No. ED 169 520, 99p., PC-\$6.32, MF-\$83)
- No. 121: Hall, W. S., & Guthrie, L. F. *On the Dialect Question and Reading*, May 1979. (ERIC Document Reproduction Service No. ED 169 522, 32p., PC-\$3.32, MF-\$83)
- No. 122: McClure, E., Mason, J., & Barnitz, J. *Story Structure and Age Effects on Children's Ability to Sequence Stories*, May 1979. (ERIC Document Reproduction Service No. ED 170 732, 75p., PC-\$4.82, MF-\$83)
- No. 123: Kleiman, G. M., Winograd, P. N., & Humphrey, M. M. *Prosody and Children's Parsing of Sentences*, May 1979. (ERIC Document Reproduction Service No. ED 170 733, 28p., PC-\$3.32, MF-\$83)
- No. 124: Spiro, R. J. *Etiology of Reading Comprehension Style*, May 1979. (ERIC Document Reproduction Service No. ED 170 734, 21p., PC-\$1.82, MF-\$83)
- No. 125: Hall, W. S., & Tirre, W. C. *The Communicative Environment of Young Children: Social Class, Ethnic, and Situational Differences*, May 1979. (ERIC Document Reproduction Service No. ED 170 788, 30p., PC-\$3.32, MF-\$83)
- No. 126: Mason, J., & McCormick, C. *Testing the Development of Reading and Linguistic Awareness*, May 1979. (ERIC Document Reproduction Service No. ED 170 735, 50p., PC-\$3.32, MF-\$83)

- No. 127: Brown, A. L., & Campione, J. C. *Permissible Inferences from the Outcome of Training Studies in Cognitive Development Research*, May 1979. (ERIC Document Reproduction Service No. ED 170 736, 34p., PC-\$3.32, MF-\$83)
- No. 128: Brown, A. L., & French, L. A. *The Zone of Potential Development: Implications for Intelligence Testing in the Year 2000*, May 1979. (ERIC Document Reproduction Service No. ED 170 737, 46p., PC-\$3.32, MF-\$83)
- No. 129: Nezworski, T., Stein, N. L., & Trabasso, T. *Story Structure Versus Content Effects on Children's Recall and Evaluative Inferences*, June 1979. (ERIC Document Reproduction Service No. ED 172 187, 49p., PC-\$3.32, MF-\$83)
- No. 130: Bruce, B. *Analysis of Interacting Plans as a Guide to the Understanding of Story Structure*, June 1979. (ERIC Document Reproduction Service No. ED 174 951, 43p., PC-\$3.32, MF-\$83)
- No. 131: Pearson, P. D., Raphael, T., TePaske, N., & Hyser, C. *The Function of Metaphor in Children's Recall of Expository Passages*, July 1979. (ERIC Document Reproduction Service No. ED 174 950, 41p., PC-\$3.32, MF-\$83)
- No. 132: Green, G. M. *Organization, Goals, and Comprehensibility in Narratives: Newswriting, a Case Study*, July 1979. (ERIC Document Reproduction Service No. ED 174 949, 66p., PC-\$4.82, MF-\$83)
- No. 133: Kleiman, G. M. *The Scope of Facilitation of Word Recognition from Single Word and Sentence Frame Contexts*, July 1979. (ERIC Document Reproduction Service No. ED 174 947, 61p., PC-\$4.82, MF-\$83)
- No. 134: McConkie, G. W., Hogaboam, T. W., Wolverton, G. S., Zola, D., & Lucas, P. A. *Toward the Use of Eye Movements in the Study of Language Processing*, August 1979. (ERIC Document Reproduction Service No. ED 174 968, 48p., PC-\$3.32, MF-\$83)
- No. 135: Schwartz, R. M. *Levels of Processing: The Strategic Demands of Reading Comprehension*, August 1979. (ERIC Document Reproduction Service No. ED 177 471, 45p., PC-\$3.32, MF-\$83)
- No. 136: Anderson, R. C., & Freebody, P. *Vocabulary Knowledge*, August 1979. (ERIC Document Reproduction Service No. ED 177 480, 71p., PC-\$4.82, MF-\$83)
- No. 137: Royer, J. M., Hastings, C. N., & Hook, C. *A Sentence Verification Technique for Measuring Reading Comprehension*, August 1979. (ERIC Document Reproduction Service No. ED 176 234, 34p., PC-\$3.32, MF-\$83)
- No. 138: Spiro, R. J. *Prior Knowledge and Story Processing: Integration, Selection, and Variation*, August 1979. (ERIC Document Reproduction Service No. ED 176 235, 41p., PC-\$3.32, MF-\$83)
- No. 139: Asher, S. R., & Wigfield, A. *Influence of Comparison Training on Children's Referential Communication*, August 1979. (ERIC Document Reproduction Service No. ED 177 493, 42p., PC-\$3.32, MF-\$83)
- No. 140: Alessi, S. M., Anderson, T. H., & Goetz, E. T. *An Investigation of Lookbacks During Studying*, September 1979. (ERIC Document Reproduction Service No. ED 177 494, 40p., PC-\$3.32, MF-\$83)
- No. 141: Cohen, P. R., & Perrault, C. R. *Elements of a Plan-Based Theory of Speech Acts*, September 1979. (ERIC Document Reproduction Service No. ED 177 497, 76p., PC-\$6.32, MF-\$83)
- No. 142: Grueneich, R., & Trabasso, T. *The Story as Social Environment: Children's Comprehension and Evaluation of Intentions and Consequences*, September 1979. (ERIC Document Reproduction Service No. ED 177 496, 56p., PC-\$4.82, MF-\$83)
- No. 143: Hermon, G. *On the Discourse Structure of Direct Quotation*, September 1979. (ERIC Document Reproduction Service No. ED 177 495, 46p., PC-\$3.32, MF-\$83)
- No. 144: Goetz, E. T., Anderson, R. C., & Schallert, D. L. *The Representation of Sentences in Memory*, September 1979. (ERIC Document Reproduction Service No. ED 177 527, 71p., PC-\$4.82, MF-\$83)
- No. 145: Baker, L. *Comprehension Monitoring: Identifying and Coping with Text Confusions*, September 1979. (ERIC Document Reproduction Service No. ED 177 525, 62p., PC-\$4.82, MF-\$83)
- No. 146: Hall, W. S., & Nagy, W. E. *Theoretical Issues in the Investigation of Words of Internal Report*, October 1979. (ERIC Document Reproduction Service No. ED 177 526, 108p., PC-\$7.82, MF-\$83)
- No. 147: Stein, N. L., & Goldman, S. *Children's Knowledge about Social Situations: From Causes to Consequences*, October 1979. (ERIC Document Reproduction Service No. ED 177 524, 54p., PC-\$4.82, MF-\$83)
- No. 148: Hall, W. S., & Guthrie, L. F. *Cultural and Situational Variation in Language Function and Use: Methods and Procedures for Research*, October 1979. (ERIC Document Reproduction Service No. ED 179 944, 49p., PC-\$3.32, MF-\$83)
- No. 149: Pichert, J. W. *Sensitivity to What is Important in Prose*, November 1979. (ERIC Document Reproduction Service No. ED 179 946, 64p., PC-\$4.82, MF-\$83)

- No. 150: Dunn, B. R., Mathews, S. R., II, & Bieger, G. *Individual Differences in the Recall of Lower-Level Textual Information*, December 1979. (ERIC Document Reproduction Service No. ED 181 448, 37p., PC-\$3.32, MF-\$83)
- No. 151: Gentner, D. *Verb Semantic Structures in Memory for Sentences: Evidence for Componential Representation*, December 1979. (ERIC Document Reproduction Service No. ED 181 424, 75p., PC-\$4.82, MF-\$83)
- No. 152: Tierney, R. J., & Mosenthal, J. *Discourse Comprehension and Production: Analyzing Text Structure and Cohesion*, January 1980. (ERIC Document Reproduction Service No. ED 179 945, 84p., PC-\$6.32, MF-\$83)
- No. 153: Winograd, P., & Johnston, P. *Comprehension Monitoring and the Error Detection Paradigm*, January 1980. (ERIC Document Reproduction Service No. ED 181 425, 57p., PC-\$4.82, MF-\$83)
- No. 154: Ortony, A. *Understanding Metaphors*, January 1980. (ERIC Document Reproduction Service No. ED 181 426, 52p., PC-\$4.82, MF-\$83)
- No. 155: Anderson, T. H., & Armbruster, B. B. *Studying*, January 1980. (ERIC Document Reproduction Service No. ED 181 427, 48p., PC-\$3.32, MF-\$83)
- No. 156: Brown, A. L., & Campione, J. C. *Inducing Flexible Thinking: The Problem of Access*, January 1980. (ERIC Document Reproduction Service No. ED 181 428, 44p., PC-\$3.32, MF-\$83)
- No. 157: Trabasso, T. *On the Making of Inferences During Reading and Their Assessment*, January 1980. (ERIC Document Reproduction Service No. ED 181 429, 38p., PC-\$3.32, MF-\$83)
- No. 158: McClure, E., & Steffensen, M. S. *A Study of the Use of Conjunctions across Grades and Ethnic Groups*, January 1980. (ERIC Document Reproduction Service No. ED 182 688, 43p., PC-\$3.32, MF-\$83)
- No. 159: Iran-Nejad, A. *The Schema: A Structural or a Functional Pattern*, February 1980. (ERIC Document Reproduction Service No. ED 181 449, 46p., PC-\$3.32, MF-\$83)
- No. 160: Armbruster, B. B., & Anderson, T. H. *The Effect of Mapping on the Free Recall of Expository Text*, February 1980. (ERIC Document Reproduction Service No. ED 182 735, 49p., PC-\$3.32, MF-\$83)
- No. 161: Hall, W. S., & Dore, J. *Lexical Sharing in Mother-Child Interaction*, March 1980. (ERIC Document Reproduction Service No. ED 184 066, 39p., PC-\$3.32, MF-\$83)
- No. 162: Davison, A., Kantor, R. N., Hannah, J., Hermon, G., Lutz, R., Salzillo, R. *Limitations of Readability Formulas in Guiding Adaptations of Texts*, March 1980. (ERIC Document Reproduction Service No. ED 184 090, 157p., PC-\$10.82, MF-\$83)
- No. 163: Linn, R. L., Levine, M. V., Hastings, C. N., & Wardrop, J. L. *An Investigation of Item Bias in a Test of Reading Comprehension*, March 1980. (ERIC Document Reproduction Service No. ED 184 091, 97p., PC-\$6.32, MF-\$83)
- No. 164: Seidenberg, M. S., Tanenhaus, M. K., & Leiman, J. M. *The Time Course of Lexical Ambiguity Resolution in Context*, March 1980. (ERIC Document Reproduction Service No. ED 184 092, 58p., PC-\$4.82, MF-\$83)
- No. 165: Brown, A. L. *Learning and Development: The Problems of Compatibility, Access, and Induction*, March 1980. (ERIC Document Reproduction Service No. ED 184 093, 76p., PC-\$6.32, MF-\$83)
- No. 166: Hansen, J., & Pearson, P. D. *The Effects of Inference Training and Practice on Young Children's Comprehension*, April 1980. (ERIC Document Reproduction Service No. ED 186 839, 53p., PC-\$4.82, MF-\$83)
- No. 167: Straker, D. Y. *Situational Variables in Language Use*, April 1980. (ERIC Document Reproduction Service No. ED 185 619, 49p., PC-\$3.32, MF-\$83)
- No. 168: Green, G. M., Kantor, R. N., Morgan, J. L., Stein, N. L., Hermon, G., Salzillo, R., Sellner, M. B., Bruce, B. C., Gentner, D., & Webber, B. L. *Problems and Techniques of Text Analysis*, April 1980. (ERIC Document Reproduction Service No. ED 185 513, 173p., PC-\$10.82, MF-\$83)
- No. 169: Green, G. M., Kantor, R. N., Morgan, J. L., Stein, N. L., Hermon, G., Salzillo, R., & Sellner, M. B. *Analysis of Babar Loses His Crown*, April 1980. (ERIC Document Reproduction Service No. ED 185 514, 89p., PC-\$6.32, MF-\$83)
- No. 170: Green, G. M., Kantor, R. N., Morgan, J. L., Stein, N. L., Hermon, G., Salzillo, R., & Sellner, M. B. *Analysis of "The Wonderful Desert,"* April 1980. (ERIC Document Reproduction Service No. ED 185 515, 47p., PC-\$3.32, MF-\$83)
- No. 171: Zehler, A. M., & Brewer, W. F. *Acquisition of the Article System in English*, May 1980. (ERIC Document Reproduction Service No. ED 186 907, 51p., PC-\$4.82, MF-\$83)

- No. 172: Reynolds, R. E., & Ortony, A. *Some Issues in the Measurement of Children's Comprehension of Metaphorical Language*, May 1980. (ERIC Document Reproduction Service No. ED 185 542, 42p., PC-\$3.32, MF-\$0.83)
- No. 173: Davison, A. *Linguistics and the Measurement of Syntactic Complexity: The Case of Raising*, May 1980. (ERIC Document Reproduction Service No. ED 186 848, 60p., PC-\$4.82, MF-\$0.83)
- No. 174: Tirre, W. C., Freebody, P., & Kaufman, K. *Achievement Outcomes of Two Reading Programs: An Instance of Aptitude-Treatment Interaction*, June 1980.
- No. 175: Asher, S. R., & Wigfield, A. *Training Referential Communication Skills*, July 1980.
- No. 176: Tanenhaus, M. K., & Seidenberg, M. S. *Discourse Context and Sentence Perception*, July 1980.
- No. 177: Hall, W. S., Linn, R. L., & Nagy, W. E. *Spoken Words*, August 1980.
- No. 178: Tanenhaus, M. K., Flanigan, H., & Seidenberg, M. S. *Orthographic and Phonological Activation in Auditory and Visual Word Recognition*, August 1980.
- No. 179: Green, G. M. *Linguistics and the Pragmatics of Language Use: What You Know When You Know a Language . . . and What Else You Know*, August 1980.
- No. 180: Steffensen, M. S., & Guthrie, L. F. *Effect of Situation on the Verbalization of Black Inner-City Children*, September 1980.
- No. 181: Green, G. M., & Laff, M. O. *Five-Year-Olds' Recognition of Authorship by Literary Style*, September 1980.
- No. 182: Collins, A., & Smith, E. E. *Teaching the Process of Reading Comprehension*, September 1980.
- No. 183: Reynolds, R. E., & Anderson, R. C. *Influence of Questions on the Allocation of Attention during Reading*, October 1980.
- No. 184: Iran-Nejad, A., Ortony, A., & Rittenhouse, R. K. *The Comprehension of Metaphorical Uses of English by Deaf Children*, October 1980.
- No. 185: Smith, E. E. *Organization of Factual Knowledge*, October 1980.
- No. 186: Hayes, D. A., & Tierney, R. J. *Increasing Background Knowledge through Analogy: Its Effects upon Comprehension and Learning*, October 1980.
- No. 187: Tierney, R. J., & Cunningham, J. W. *Research on Teaching Reading Comprehension*, November 1980.
- No. 188: Baker, L., & Brown, A. L. *Metacognitive Skills and Reading*, November 1980.
- No. 189: Brown, A. L., Campione, J. C., & Day, J. D. *Learning to Learn: On Training Students to Learn from Texts*, November 1980.